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(TRANSLATION OF APPLICATION AS ORIGINALLY FILED)

DEPOT AND METHOD FOR OPERATING A DEPOT

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the priority of the Swiss patent application No. 1999 0761/99, which has been filed on April 23, 1999 and of which the disclosure shall be incorporated herein by reference.

BACKGROUND

The present invention relates to a depot and a method of operating a depot in accordance with the introduction portions of the independent claims.

A depot serves for a storing of articles for a determined or undetermined time and to make them available on request for delivery or for a set date. It is, hereby, of importance that the stored articles occupy a as small as possible storage space and, furthermore, can be stored and retrieved, respectively, as fast as possible. In addition to the space requirements the needed ground area is of an additional importance.

PRIOR ART

These demands have led to depots being designed practically exclusively as shelf like building structures

with a plurality of floors and with a plurality of often same storage areas.

DE 3902080 A1 discloses a parking house which is of a shelf-like design and includes parking boxes with parking spaces for motor vehicles above each other as well as adjacent each other and behind each other. The vehicles are parked in a loading bay on palettes and stored through a shelf stacking device in the parking boxes. The delivery of the vehicles proceeds in the opposite sequence.

US 5304026 discloses an automatic device having several floors and a shelf like structure for the parking of vehicles, which includes parking boxes with parking spaces for motor vehicles above each other as well as aside of each other and behind each other. The vehicles are parked in the loading stations on palettes and are stored by elevators in the parking boxes. The delivery of the vehicles proceeds in the opposite sequence.

Whereas the need of a as high as possible density of the stored articles is sufficiently met by the presently known designs of automatic depots, the processing time for the storing and delivering, respectively, of articles by these depots is not satisfactory.

SUMMARY OF THE INVENTION

Therefore, it is an object to provide a depot and a method for operating a depot, in which simultaneously at a high density of the articles an as short as possible processing time for the storing and delivery, respectively, of articles is achieved in order to allow therewith at a small requirement on space a high rate of handled articles and a good availability of the stored articles.

This object is arrived at by the depot and the method for operating a depot, respectively, in accordance with the independent claims.

In one aspect of the invention the depot comprises at least one input station with at least two cells, of which each is used alternatively used once as loading cell for the receipt of a new article and at the other time as transfer station to the storing system for a previously received article. This allows a substantially simultaneous receiving of a new article parallel to the transferring of the previously received article to the depot system. By means of this, it is possible to reach at a given number of input stations a considerably increased throughput regarding articles to be stored.

According to a preferred embodiment each cell is located during the receiving of an article and during the placing of the article on to the storage system in a different position wherewith a spatial separation between receiving of articles and transferring of articles is arrived at and accordingly a independent operation of these functions is possible. The cells of the input station form preferably a unit which is positionable at least at two positions wherewith the possibility of a timely alternating, common use of certain positions for the receiving and transferring respectively of articles is arrived at. By means of this, a minimum of space is needed for the input station.

When the cells are displaceable in a vertical direction, the receiving of an article and the transferring onto the depot system may be carried out at positions located above each other which reduces the floor area needed for the input station to a minimum.

The input station includes preferably two cells of which each is displaceable between two positions. By this,

it becomes possible to operate the cells intermittently, this means that alternatingly one cell receives an article while the other cell transfers a different article to the depot system and vice-versa, wherewith an operation without any non productive idling times of individual cells as well as an optimal utilisation of space at the input station is arrived at.

When at least one of the cells includes means for a rotating of the articles, it is possible to already provide a desired orientation for a transferring of the article to the depot system which leads to a saving on time during a later delivery.

This embodiment is specifically advantageous when a depot is operated as parking house, because here, independently from the drive in direction into the input station, any desired delivery orientation can be reached by rotation. This reduces the space requirement of the delivery station because now space for a possible manoeuvring must be provided and the driving out from the delivery station is facilitated which allows a saving on time when delivering the vehicles.

In a further preferred embodiment the input station can be operated as desired as delivery station and the delivery station as desired as input station, respectively. In this case, the stations are also called loading stations.

In addition to at least one apparatus for serving shelves, additionally driven stationary transfer means for a displacing of articles in the depot system and/or for a storing of articles on storage areas of the depot and/or for a delivery of articles from the storage areas of the depot system may be foreseen. It also foreseen that additionally stationary lifting means for a vertical displacing of articles are arranged in the depot system. This lifting means are

placed advantageously close to the input/delivery stations in a margin area of the depot system and may be structured in relation to their mechanisms for a vertical displacing similar to the apparatuses for serving the shelves. This leads to the possibility to use, depending from the concerned depot position, apparatuses for serving shelves and/or stationary transfer means and/or stationary lifting means for a storing and delivering, respectively, of an article into and out of the depot system. The stationary displacement means and the stationary lifting means, respectively, include own drives. If the storing and delivery, respectively, of an article into and out of the depot system proceeds by means of stationary displacement and/or stationary displacement and/or stationary lifting means and without the aid of a shelf serving apparatus, the shelf serving apparatus can execute at the same time a different assignment. Furthermore, this preferred embodiment has the possibility of the shelf serving apparatus to retrieve an article at a position different from the depot position and to move this article by aid of stationary displacement means and/or stationary lifting means to the intended depot position during which the shelf serving apparatus operates already with the next following assignment. A stored article may in the same way be brought with the aid of displacement means and/or lifting means to a position which is faster accessible for the shelf serving apparatus during which the shelf serving apparatus operates at a different commission or, however, to reduce the time of access for this article. In these cases, a saving on time is arrived at which allows a further increase of the throughput of articles and the availability of the articles.

If additionally stationary means for a rotating of the articles are located in the depot system, there is the possibility to align the article already before the storing

on a storage place or, however, prior to the delivery into a desired direction. Specifically in parking houses in which the input and delivery stations are arranged at the same side or in which the stations are operated as desired as input and delivery stations respectively, thus form loading stations, a substantial simplification for the user and possibly a shortening of delivery times is arrived at.

In a further preferred embodiment of the invention, the depot is equipped with at least two shelf serving apparatuses which include transfer means for a direct transferring of at least one article among each other. This embodiment allows a work dividing operation of the shelf serving apparatuses among each other, so that some of the operating steps for a storing and delivering, respectively, of an article may in part be executed at the same time by the shelf serving apparatuses. By means of this, a saving on time is arrived at.

At least a first shelf serving apparatus includes preferably more receiving spaces for articles than a second shelf serving apparatus. This embodiment allows to design the one shelf serving apparatus with a considerably smaller weight than the other one. This leads to differences of the masses of the shelf serving apparatuses which are to be accelerated and decelerated when in operation which leads to saving on time when processing a storing and retrieving, respectively, because the shelf serving apparatus which is of the lower weight is used preferably for a processing of movement intensive duties and the shelf serving apparatus having the higher weight takes mainly care of intermediate storage functions with only few moving operations.

The transfer means of the shelf serving apparatuses are preferably designed in such a manner that they can hand over between each other at least one article during a

moving operation, wherewith a transferring is possible time parallel to a moving to a destination position which leads to a saving on time during a processing of a commission.

In a further aspect of the invention, the depot, which includes a plurality of spaces for articles and a automatic storage system with a shelf like design as well as transfer means of which each transfer means can move articles between at least two locations, is operated in such a manner that at least two of the transfer means execute the steps of operation for the storing and retrieving, respectively, of one single article in an operation dividing the work between themselves, wherewith a in part at the same time proceeding operation of the work steps is made possible. This leads to a saving on time.

The transfer means operated for a storing and retrieving, respectively, of a single article comprise preferably at least two shelf serving apparatuses or at least two driven stationary displacement means or at least one shelf serving apparatus and one driven stationary displacing means which, co-operate in a work dividing way as mentioned above. Further preferred embodiments foresee additionally or alternatively the operation of at least one stationary lifting means for a vertical displacing of articles. Additionally, the operation of stationary means located in the depot system is also foreseen for a rotating of articles.

If the articles are arranged in the shelves in several layers, a shelf serving apparatus may retrieve and again store articles located in front of a storage space which should be accessed, whereas the article to be moved is commissioned by a further shelf serving apparatus, which again increases the operating speed.

Furthermore, the first shelf serving apparatus can store or retrieve articles located in front of a storage

base to be accessed during which the second shelf serving apparatus retrieves the article to be moved from a input station or a transfer means, e.g. a stationary displacement means, of the depot or brings it to a delivery station or a displacing means of the depot.

In a further preferred embodiment, the depot comprises stationary displacement means and is designed in such a manner that the transferring between an input station, loading station or a delivery station of the depot and the stationary displacement means proceeds directly and on the same vertical position as the transferring between a user and the input station, the loading station or the delivery station.

Depending from the situation it is also preferred that the transferring between a input station, a loading station or a delivery station and the stationary displacement means proceeds directly transversely to the transferring direction between station and user. It is additionally foreseen that, in case of depots having several stations, the stations may include differing displacement means to the system and the user, respectively, and/or that the parking building is designed in such a manner that the direction of the transfer between a station and the displacement means of the depot system may be determined selectively depending from the optimal pass of operation.

In a further aspect, the depot having a automatic storage system includes at least one stationary means for a rotating of articles in its storage system, specifically a stationary means for a rotating of the articles around a vertical access, because by means of this the desired storing and/or retrieving orientation can be arrived at wherewith a shortening of the retrieving time and a decrease of the space requirement at the delivering is arrived at.

DESCRIPTION OF THE DRAWINGS

Further preferred embodiments of the invention follow from the depending claims and also from the now following descriptions with reference to the drawings. There is illustrated in:

Fig.1 a side view of a shelf like designed parking house with two shelf serving devices;

Fig.2 a floor plan of the drive in and drive out floor of a parking house variant with input and delivery stations arranged at the same sides;

Fig.3 a floor plan of the floor above the drive in and drive out floor of figure 2;

Fig.4 a floor plan of the drive in and drive out floor of a further parking house variant with input and delivery stations at opposite sides;

Fig.5 a section along the lines A-A of Figures 2 and 4;

Fig.6 a section along the line B-B of Figure 4;

Fig.7 a section along the line B-B of figure 4; and

Fig.8 a floor plan of the drive in and drive out floor of a further variant of a parking house with loading stations, a stationary lifting means and a stationary means for a rotating.

MANNERS OF PRACTISING THE INVENTION

The basic design of a preferred embodiment of the invention in form of a car park building is illustrated in

figure 1. The shelf like designed parking house includes a plurality of parking spaces with a plurality of rows X0-X7 and on several floors Y0-Y5. The park house includes, furthermore, transfer means which include a plurality of displacement means 12 and two shelf serving apparatuses 1,2. The shelf serving apparatuses 1,2 are displaceable along the rows X0-X7.

Such as seen in Figures 2 and 3, each row includes a plurality of storage places a,b,c,d,e,f,g,h arranged behind each other and forms the horizontal displacement path of the shelf serving apparatuses a lane 13 between two rows of shelves having the same depth.

Such as illustrated in Figure 5, both shelf serving apparatuses 1,2 can individually be displaced in this lane 13 and include receiving places E,F,G,H for vehicles which are displaceable vertically. Such as can be seen further in the illustration, the first of the shelf serving apparatuses 1 includes only one receiving space E for one single vehicle whereas the second shelf serving apparatus 2 provides tree receiving places F,G,H. In the here illustrated case the receiving spaces F,G,H of the shelf serving apparatus 2 can be displaced together only, however, embodiments are also foreseen in which the receiving places are vertically displaceable independently from each other.

Such as shown in figure 2, the driving in and driving out of the parking house proceeds in this embodiment from the same side. The narrow side of the parking house includes two input stations 3,4 and tree delivery stations 5,6,7, whereby the input stations include means 8 for a rotating of the vehicles in the cells 9. These rotating means 8 may be for instance rotating tables, an arrangement of rollers or similar. Such as already mentioned, it is also foreseen to arrange stationary means for a rotating in the

storage system itself, which, however, leads to a reduction of the available storage places. These rotating means 8 may have a structure which is similar to the above described embodiments.

Such as can be seen in figure 6 and 7, each input station includes two cells which are displaced in vertical direction as one unit between two position, wherewith the two cells are located alternatively once at the drive-in floor and the other time in the floor located above or below the drive-in floor. Both cells 9 are open at their front surfaces. If a cell 9 is located at the drive-in floor, its inner space is limited at its end against the parking house by a wall 10 of the house. The end surface at the drive-in side is open and allows a driving into the cell 9. If one cell 9 is located at the floor above or below the drive-in floor its inner space is limited at the drive-in side at the end surface by a wall 10 of the building. The end surface facing into the parking house is open and allows the transferring of a vehicle to the depot system by either ~~stationary~~ displacement means 12. Furthermore, additional driven stationary displacement means 12 for a displacing of vehicles between the rows X0-X7 of each floor and also within the storage spaces a,b,c,d and e,f,g,h, respectively, of each row of the floor are foreseen. These displacement means 12 can be formed for instance by a system of rollers or conveyer strips, of chain conveyers, a rail system or similar. When now the above described embodiments describe exclusively depots with separate input and delivery stations, embodiments are also foreseen in which the stations can be operated freely selectable as input or delivery stations, thus form loading stations. This leads to the advantage that depending from a necessary capacity for loading and discharging, respectively, it is possible to adapt the depot accordingly. Specifically in case

of parking houses with a cyclical peak load, for instance in parking houses of companies, a distinct advantage regarding time for the user is arrived therewith. Additionally, also embodiments are foreseen in which during times of a reduced loading a vertical displacing of the cells 9 of the input station 3,4 is not used and the vehicles are transferred exclusively by horizontal displacement in the longitudinal or transverse direction between the cell located at the drive-in floor and a stationary displacement means 12 of the depot system on the same floor. The wall 10 of the building located at the drive-in floor can be designed in such a case as e.g. a automatic operated rolling door.

The design of the parking house illustrated in figure 4 differentiates from the one illustrated in figure 2 in that the inputting and delivering of vehicles takes place at opposite sides, wherewith a rotating of vehicles is not made. The input stations 3,4 are accordingly at other locations and include no means for a rotating of the vehicles. The rest of the concept is the same as the one of figure 2.

In the following the general operation when storing a vehicle in the parking house according to figure 2 will be described. The vehicle to be stored is driven by a driver into the cell 9 of one of the two input stations 3,4 located at the driving in floor and parked thereat. Depending from the design, the parking space may be formed by a transport system carrier, such as e.g. a pallet, or also by a transport system having no support, such as e.g. transport rollers. If a support is used, it is delivered to the cells 9 from a separate storage. After the driver has left the vehicle and the cell 9 of the input station 3,4, the two cells 9 of the input station 3,4 located above each other are displaced as a unit in vertical direction so that the cell 9 with the vehicle is located at the floor above or under the

drive-in floor and the second, empty cell 9 is located at the drive-in floor. During the displacing operation, the vehicle in the cell 9 is rotated by a built-in rotating apparatus 8, e.g. a rotating table, into the desired delivery position. After the displacing of the cells 9 and the rotating of the vehicle is terminated, the vehicle is transferred by aid of stationary displacement means 12 to the storage system. In this embodiment, the transferring occurs in the direction of the drive-in in and parallel to the direction of displacement of the shelf serving apparatus 1,2. If a system with supports, such as e.g. palettes, is used, the serving of the cell 9 with a empty support from a storage for the supports proceeds in this position.

Simultaneously with the transferring of the first vehicle to the depot system, the next vehicle can now be driven at the drive in floor into the second cell 9 of the input station 3,4 and parked thereat. After the transferring of the first vehicle from the first cell 9 of the input station 3,4 to the storage system has been terminated and the loading procedure of the second cell 9 is terminated, both cells 9 are displaced as unit in vertical direction into the original position during which the next vehicle in the second cell 9 is rotated into the desired delivery position. After the displacing of the cells 9 and the rotating of the vehicle have been terminated, the now empty first cell 9 is ready for a renewed loading during which the transferring of the next vehicle from the second cell 9 to the storage system occurs. This procedure is repeated at the inputting of further vehicles into the parking house.

The first vehicle, which has been passed on to the depot system, will now, depending from which free storage place has been allocated for the same by the process control and how this place may be reached the best way by the actual

occupation of places, been forwarded with aid of the stationary displacement means 12 and/or the shelf serving apparatuses 1,2 to this predetermined storage place. If the predetermined storage place is at a floor different from the input floor or should it be not reachable by a longitudinal and/or transversal displacing by means of the stationary displacement means, the vehicle will be shifted to a place adjacent the transfer lane 13 of the shelf serving apparatuses 1,2 from where the further storing of the vehicle on the predetermined storing place proceeds through the shelf serving apparatus 1,2. To this end one of the shelf serving apparatuses 1,2, takes the vehicle to be stored over from the place adjoining the transfer lane and stores it provisionally on one of its receiving places E,F,G,H. If the predetermined storing place can not be reached by the shelf serving apparatus 1,2 with the vehicle to be stored or if it is necessary for a storing of the vehicle on the predetermined storing place to make an intermediate storing of a plurality of vehicles located in front of same of which the number exceeds the capacity of the intermediate storing of the shelf serving apparatus 1,2 which has received the vehicle, a operation dividing co-operation of both shelf serving apparatuses 1, 2 and of the stationary displacement means 12 occurs at the storing of this vehicle. If the storing system of the illustrated parking house has additionally stationary lifting means 14, it would be in the same sense foreseeable that, depending from the rate of utilisation of the shelf serving apparatuses 1,2 and the position of the predetermined storage place, the storing is made by aid of the stationary lifting means, with or without co-operation of a shelf serving apparatus 1,2.

The operation during the storing can be best described with reference to a concrete example:

A vehicle to be stored is driven into the input station 3 and parked thereat. After the driver has left the vehicle and the cell 9, a vertical displacement of both cells 9 of the input station 3 occurs, so that the vehicle to be stored is placed to be ready in the floor above or under the drive-in floor (see figure 3) for a transferring to the depot system. During the vertical displacing of the cells 9, the vehicle is simultaneously rotated through the rotating device 8 by 180°, wherewith a storing in the driving out direction is made possible. After the vehicle has been transferred from the cell 9 onto the depot system, the vehicle to be deposited is located at the place c1 from where it, in case the predetermined storage base may not be reached by a longitudinal and transversal displacing by means of stationary displacement means 12, is displaced to the place d1. For this example it is assumed that the storage base for this vehicle, which has been determined by the depot system, is at the position h6 in a different floor and that at the same time, the storage places e6,f6 and g6 in the other floor are occupied by vehicles. It is now not possible to reach this place from the transfer place c1 by a longitudinal and lateral, respectively, displacing. For this reason, the vehicle is now made ready by a transverse displacing onto position d1 for a further depositing through the shelf serving apparatus 1,2. During the movement now of the first shelf serving apparatus 1 to the position d1 in order to receive the vehicle at its receiving place E, the shelf serving apparatus 2 moves to the storage place e6 of the floor of the predetermined storing place and stores the vehicle located thereat as an intermediate storing on the receiving place H. Thereafter, the three receiving places of the shelf serving apparatus 2 are displaced vertically so that the receiving place G is available to receive a further vehicle which has been transferred by a

transverse displacement from the storage place f6 to place e6. In the same manner, the vehicle which is stored on the storage place g6 is taken over on to the receiving place F of the shelf serving apparatus 2 and stored thereat temporarily. During the time, during which the shelf serving apparatus 2 makes the temporary intermediate storing of the vehicles located on the storage places e6,f6,g6, the shelf serving apparatus 1 with the vehicle to be stored has started to move towards the predetermined storage place and its storage place E has already being displaced vertically to the predetermined final floor. After all temporarily stored vehicles are located on the receiving places of the shelf serving apparatus 2, this apparatus will move horizontally in the shelf row X7. At the same time the shelf serving apparatus 1 with the vehicle to be stored moves in the shelf row X6 and transfers thereafter the vehicle to the storage place e6. The now free storage serving apparatus 1 moves towards a new destination position and during this time the shelf serving apparatus 2 occupies again its old position in the row X6 and begins in the inverse sequence with re-storing of the vehicles located on the receiving places F,G and H onto the storage places e6,f6,g6. At the same time, the vehicle to be stored is stored now by a transverse displacement by means of stationary displacing means from the place e6 to the storage place h6.

The general sequence when delivering a vehicle out of the parking house will now be described. The storage position of a vehicle to be delivered is determined by the process control and the fastest path for delivery in consideration of the actual occupation of the places is evaluated. If the vehicle to be delivered is located on a storage place from which the desired delivery station 5,6,7 can be reached in view of the actual occupation of places by a longitudinal

and/or transverse displacing on the floor, the positioning of the vehicle for a transferring to the delivery station 5,6,7 will proceed without the co-operation of the shelf serving apparatuses 1,2 directly by the stationary displacement means 12. If the delivery station 5,6,7 can not be reached from the storage place of the vehicle to be delivered exclusively by a longitudinal and/or transverse displacing, the delivering of the vehicle must be made by aid of one of the two or of both shelf serving apparatuses 1,2. If the storage place is not directly adjacent the transfer lane 13 of the shelf serving apparatuses 1,2, the vehicle must be firstly placed to be available by a possible temporary storing of vehicles located in front of the same and a displacing to a place adjoining the transfer lane 13 of the shelf serving apparatuses 1,2 for a transfer to one of the shelf serving apparatuses 1,2 from where then the further delivering of the vehicles proceeds by the shelf serving apparatuses 1,2. To this end one of the two shelf serving apparatuses 1,2 takes the vehicle to be delivered from the place adjoining the transfer lane 13 and stores it temporarily on one of its receiving places E,F,G,H.

If the predetermined place for a transferring to the predetermined delivery station 5,6,7 can not be reached by the shelf serving apparatus 1,2, which has received the vehicle to be delivered, or if it is necessary for retrieving the vehicle from the storage place to temporarily store at a intermediate storage a plurality of vehicles which are stored in front of said storage place and which exceed in number the intermediate storing capacity of the shelf serving apparatuses 1,2 which receives the vehicle, a work dividing cooperation of both shelf serving apparatuses 1,2 and of the stationary displacement means 12 occurs during the delivering of this vehicle.

The best way to describe the operation when delivering can be made based on a concrete example:

When the vehicle which has been stored previously on the storage place h6 is to be delivered, the shelf serving apparatus 2 moves, such as already described with reference to the storing into position in row X6 and takes the vehicles stored on the storage places e6,f6 and g6 onto its receiving places H,G and F for an intermediate storing. At the same time, the vehicle to be delivered is displaced step by step by means of stationary displacement means 12 from the storage place h6 to the place e6. After the intermediate storing has been made the shelf serving apparatus 2 moves in row X7 during which moving the shelf serving apparatus 1 moves into row X6, whereby its receiving place E has already been brought vertically into position. The shelf serving apparatus 1 takes now the vehicle to be delivered over from the place e6 onto its receiving place E and begins to move in the direction of the delivery station 5,6,7, whereby the receiving place E with the vehicle to be delivered located on same is displaced vertically into the delivery floor (see figure 2). At the same time, the shelf serving apparatus 2 begins with the re-storing of the temporarily stored vehicles such as already described with reference to the storing.

After the shelf serving apparatus 1 has reached row X0, it transfers the vehicle to be delivered to the place e0, from where the delivery stations 5 and 6 can be reached by a transverse displacing by means of stationary displacing means to the positions h0 and f0. It is also possible to place the vehicle directly onto the receiving place E of the shelf serving apparatus 1 of the delivery station 7. After the vehicle has been placed for a delivery station 5,6,7, the vehicle to be delivered is transferred by a longitudinal displacement to the delivery station 5,6,7 where it is taken

over by the driver and is driven out of the delivery station 5,6,7.

If for instance a vehicle must be delivered from the storage place g6, which contains only two vehicles placed between this vehicle and the transfer lane of the shelf serving apparatuses, there exist a possibility that the shelf serving apparatus 2 takes the vehicles standing in front of the vehicle to be delivered from the storage places e6,f6 and the vehicle to be delivered from the storage place g6 over onto its receiving places H,G,F, during which the shelf serving apparatus 1 positions itself aside of same. Thereafter, both shelf serving apparatuses 1,2 move in the direction to the delivery station 5,6,7. During the moving operation, the vehicle to be delivered is transferred from the receiving place F of the shelf serving apparatus 2 to the receiving place E of the shelf serving apparatus 1. After the transfer has been completed, both shelf serving apparatuses 1,2 separate from each other and the shelf serving apparatus 1 moves towards the destination delivery station and at the same time the shelf serving apparatus 2 moves back to its initial position and stores again the temporarily stored vehicles. A similar operation is also foreseeable for a storing.

There are also operations by which the transfer of a vehicle between shelf serving apparatuses which stand still lead to a shortening of the time for carrying out a commission. Furthermore, the access to the corner places h7,a7 is possible by this kind of operation which adds to a excellent utilisation of space.

Besides the examples described above regarding the storing and delivering, respectively, there is a multitude of other combinations in which, besides a saving on time by a in part simultaneous working of the storing commissions

in the input stations 3,4, the work dividing operation of the two shelf serving apparatuses 1 and 2 among each other and together with the stationary displacement means 12, and where present, additionally together with stationary lifting means 14 and/or means for a rotating of articles leads to an additional shortening of the input and delivery time, respectively, when working the commissions. The respective optimal solution at a actual occupation and occupation constellation is determined by the process calculator of the depot system, which correspondingly controls the co-operating of the individual active components of the depot system.

Besides the control of all active components depending from the prevailing occupation for a as high as possible time-optimal execution of the storing and delivering commissions, respectively, the process calculator of the depot system is in a position, also in the absence of a direct storing or delivery order, to make internal transfers or also e.g. to transfer vehicles, which are to be delivered at a certain date and time, temporarily into storage places which are less accessible and to keep these vehicles for the probable time of delivery ready on storage places which can be accessed fastly. Also group-wise preparations can be thought of, so that e.g. all vehicles of one group are made ready on the storage places h1 to h7 and thus can be transferred directly when called upon by a longitudinal displacing by means of stationary displacing means 12 to the delivery station 5. This operation would have no influence on the normal inputting and delivering, respectively, of the operation of the parking house during the delivering of this group of vehicles.

Figure 8 illustrates a plan view of the drive-in and delivery floor of a further variant of a parking house with three stationary loading stations 15, which can be

operated as desired depending from the necessity as input or delivery stations. In the illustrated case, the parking house is designed in such a manner that the transfer between a loading station 15 and displacement means 12 of the depot system is made exclusively by a longitudinal displacing of the vehicles and accordingly take place on the same vertical position (also in the drive-in and drive-out, respectively, floor) such as also the transfer of the vehicle between the loading station 15 and the user. As can be seen, the illustrated parking house includes additionally in its storing system a stationary lifting means 14 for a vertical displacing of vehicles between the floors of the parking house and stationary means 8 for rotating the vehicles around the vertical axis into the desired storing and delivery, respectively, orientation. The rest of the design of the illustrated parking house and the other kinds of operation are the same as at the embodiments described above.

Whereas preferred embodiments of the invention are described in the present application, it must be stated clearly that the invention is a not restricted to these and may also be practised otherwise within the scope of the following claims.